

WHAT IS CLAIMED IS:

1. A method of purifying a hydrogen peroxide solution, comprising:

(a) preconditioning a resin by a method comprising (i) washing the resin with deionized water to produce a washed resin, and (ii) contacting an effective amount of a preconditioning hydrogen peroxide solution with the washed resin to remove impurities from the washed resin, thereby producing a preconditioned resin;

(b) passing a hydrogen peroxide solution to be purified through a bed of the preconditioned resin to form a hydrogen peroxide solution having a TOC content lower than a TOC content of the hydrogen peroxide solution to be purified; and

(c) passing the hydrogen peroxide solution having a TOC content lower than TOC content of the hydrogen peroxide solution to be purified through one or more ion-exchange resin beds,

wherein the preconditioning hydrogen peroxide solution does not pass through the ion exchange resin beds.

2. The method of claim 1, wherein the preconditioning hydrogen peroxide solution and the hydrogen peroxide solution to be purified are supplied from the same hydrogen peroxide source.

3. The method of claim 1, wherein the preconditioned resin has a TOC removal capacity of about 50% or more of the resin's TOC removal capacity prior to

preconditioning, and a residual impurity level of about 100 ppb or less.

4. The method of claim 1, wherein the preconditioned resin has a TOC removal capacity of about 80% or more of the resin's TOC removal capacity prior to preconditioning.

5. The method of claim 1, further comprising opening a valve in a conduit between the resin bed and the ion-exchange resin beds after step (a) is completed.

6. The method of claim 5, wherein the valve in the conduit is opened after passing a predetermined amount of the preconditioning hydrogen peroxide solution through the resin during step (a).

7. The method of claim 5, further comprising:  
(a') assaying the preconditioning hydrogen peroxide solution after contact with the resin, and opening the valve when a predetermined hydrogen peroxide concentration has been reached.

8. The method of claim 7, wherein the assaying is performed using a hydrogen peroxide concentration sensor downstream of the resin.

9. The method of claim 8, wherein the valve is automatically controlled based on a measurement signal from the concentration sensor.

10. The method of claim 7, wherein assaying the hydrogen peroxide is conducted after passing more than about 10 BV preconditioning hydrogen peroxide solution through the resin.

11. The method of claim 5, wherein the valve in the conduit is opened after a predetermined amount of time has passed from starting the passing of the preconditioning hydrogen peroxide solution through the washed resin.

12. The method of claim 1, wherein the preconditioning hydrogen peroxide solution contains about 10 wt% or more hydrogen peroxide, based on the solution.

13. The method of claim 12, wherein the preconditioning hydrogen peroxide solution contains about 30 wt% hydrogen peroxide, based on the solution.

14. The method of claim 1, wherein the volume of the deionized water passed through the resin in step (a) is from about 20 to 200 bed volumes.

15. The method of claim 1, wherein the volume of the preconditioning hydrogen peroxide solution passed through the resin in step (a) is from about 3 to 20 bed volumes.

16. The method of claim 15, wherein the volume of the preconditioning hydrogen peroxide solution passed

through the resin in step (a) is from about 7 to 16 bed volumes.

17. The method of claim 1, wherein the resin is hydrophobic.

18. The method of claim 1, wherein the resin is AMBERLITE XAD-4.

19. A method of purifying a hydrogen peroxide solution, comprising:

(a) preconditioning a resin by a method comprising (i) washing the resin with deionized water to produce a washed resin, and (ii) contacting an effective amount of a preconditioning hydrogen peroxide solution with the washed resin to remove impurities from the washed resin, thereby producing a preconditioned resin;

(b) passing a hydrogen peroxide solution to be purified through a bed of the preconditioned resin to form a hydrogen peroxide solution having a TOC content lower than a TOC content of the hydrogen peroxide solution to be purified; and

(c) directing the hydrogen peroxide solution having a TOC content lower than a TOC content of the hydrogen peroxide solution to be purified to a point of use in a semiconductor manufacturing facility through a conduit disposed between the bed of preconditioned resin and the point of use,

wherein the preconditioning hydrogen peroxide solution is not directed to the point of use.

20. A method of purifying a hydrogen peroxide solution, comprising:

- (a) preconditioning a resin by a method comprising (i) washing the resin with deionized water to produce a washed resin, and (ii) contacting an effective amount of a preconditioning hydrogen peroxide solution with the washed resin to remove impurities from the washed resin, thereby producing a preconditioned resin;
  - (b) passing a hydrogen peroxide solution to be purified through a bed of the preconditioned resin to form a hydrogen peroxide solution having a TOC content lower than a TOC content of the hydrogen peroxide solution to be purified;
  - (c) passing the hydrogen peroxide solution having a TOC content lower than a TOC content of the hydrogen peroxide solution to be purified through one or more ion-exchange resin beds to form a purified hydrogen peroxide solution; and
  - (d) directing the purified solution to a point of use in a semiconductor manufacturing facility through a conduit disposed between the one or more ion-exchange resin beds and the point of use,
- wherein the preconditioning hydrogen peroxide solution does not pass through the ion exchange resin beds and is not directed to the point of use.